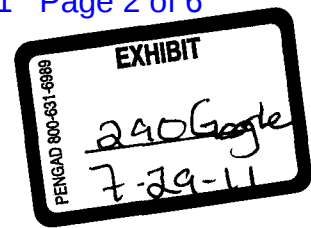# EXHIBIT F

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August 23, 1999 3:30 PM PDT

Sun, IBM decaffeinate JavaOS

By Stephen Shankland
Staff Writer, CNET News

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Sun and IBM have pulled the plug on JavaOS for business, an ill-fated attempt to power a Java-only computer that bypassed Windows and other operating systems.

The project, announced April 1, 1998, was a joint development

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and marketing effort by Sun and its closest Java partner, IBM. It aimed to create an operating system that could effectively serve as the cornerstone of Java-centric desktop computers. But, like other Java-centric desktop computer efforts, few customers adopted it.

The cancellation prunes away one of the many branches of the Java tree, which extends to areas as diverse as cell phones, corporate servers, television, and arrays of hard disks. Java has proven popular in several of those areas, but the cancellation of JavaOS for Business illustrates that there are limits to that popularity.

The JavaOS technology was a key part of both IBM's and Sun's efforts to push "thin clients," the stripped-down computers such as Sun's Javastation that rely on a powerful central server and a network connection.

Although JavaOS didn't catch fire, both IBM and Sun are proceeding with thin client products in other areas. Sun will debut its new "Corona" thin client in New York on September 8, and IBM will debut a new Intel-based thin client this year as well, sources say.

"I think it was something that a blind man would have seen coming," said Aberdeen Group analyst Tom Dwyer of the cancellation of JavaOS for Business.

"It just never quite got up enough support and headway to compete against any other desktop operating system," particularly Windows, Dwyer said. "If you look at the combination that Windows has on the desktop and the inroads that Linux will make on the desktop, you pretty quickly reach the point where you just don't need another OS. There just wasn't anything compelling from a Java perspective that the customer couldn't get already."

Sun positioned the cancellation of the program as a victory for thin client computing. "Our model prevailed," said Lisa Carnochan. product line manager for client software and network computer systems at Sun. "The Internet itself has made so much software available that already fit our model, we didn't have to invest specifically in an operating system to do it," although the JavaOS effort was in fact a specific investment in an operating system.

The IBM and Sun employees assigned to the work have been transferred to other Java or thin client tasks, the companies said.

The virtual machine wins out

Although JavaOS disappears, Java will remain intimate with mainstream computing through the Java Virtual Machine (JVM), said IBM spokesman Jeff Tieszen. Where JavaOS was an operating system for running Java programs, a virtual machine is a piece of software that lets Java programs run on any type of computer system. Java virtual machines, or JVMs, got faster and worked on a wide variety of hardware systems.

Where JavaOS runs only Java programs, a JVM can run on a Windows, Macintosh, Linux, or other systems.

"JVMs won out over JavaOS," Tieszen said. "When you go back to when IBM first announced [JavaOS for Business], part of the reasoning was that Java performance was a real question mark at that time.

"One of the thoughts was that in developing a Java-only operating system, Java applications running natively would be a lot faster than running on a JVM," he said. "That was true, but since that time, performance on JVMs has increased dramatically."

Though several manufacturers licensed JavaOS for Business, the demand just wasn't there. Wyse, for example, dropped JavaOS and instead went with Linux for its thin clients.

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